

# **2020-2022 Short-Term Occupational Projections Methodology**

## **I. Introduction**

Occupational and industry employment projections are valuable sources of information for anyone interested in studying future employment trends or job openings in the state of Kansas. Current projections use the first quarter of 2020 as the base period to project employment in the first quarter of 2022. The 2020-2022 industry and occupational projections were funded by the United States (U.S.) Department of Labor's (DOL) Employment and Training Administration (ETA).

## **II. Four Principal Phases in the Creation of Short-Term Projections**

### **1. Creation of Industry Level Historical Employment Trends Time Series**

- a. The measure of employment used in projections is considered to represent total employment in the state. As such, it is required that data be collected from several sources. The two principal sources from which the time series is created are the Quarterly Census of Employment and Wages (QCEW) data, which includes Kansas employment that is covered by Unemployment Insurance (UI) law, and Current Employment Statistics (CES) data for employment that is not covered by UI law. The monthly historical time series starts in January 1990, and the last observation is employment in March 2020.
- b. Another source of data covering Self-Employed Workers (SE) is the Bureau of Labor Statistics (BLS). BLS provides ratios of employment for the base period (first quarter of 2020) and projected period (first quarter of 2022) which are applied to occupational level employment to determine the employment levels of SE. This level of employment is added back to the appropriate occupations to obtain employment totals that include SE.
- c. The time series data is also adjusted according to standardized procedures to more closely align employment in school, hospital and government series with their descriptions. State, local and federal government school and hospital employment is subtracted from government employment (92, 93 and 9991 respectively) and added to the educational services (61) and health care and social assistance (62) sectors. Also, postal service employment is subtracted from federal government employment and added to transportation and warehousing (48).
- d. County level data are aggregated to create regional and statewide data used in projections. Non-geographic identifiable employment, such as traveling salesmen, is summed and apportioned by industry to each region to get a more accurate measure of statewide employment. The time series of employment is the foundation for industry employment projections.

### **2. Projecting Industry Level Employment**

- a. To develop industry employment projections for the State of Kansas and seven sub-state areas, the Labor Market Information Services (LMIS) division of the Kansas Department of Labor (KDOL) utilizes the Short-Term Industry Projection (STIP) program. There are several time series models available in STIP. These include univariate time series models (linear trend, exponential smoothing, Random Walk (RW) with and without drift, Auto-Regressive Moving Average (ARMA)) and multivariate models (Ordinary Least Squares (OLS), Vector Auto-Regression (VAR) and Bayesian VAR).

### 3. Creation of Occupational Staffing Patterns

- a. This phase comprises collection and analysis of the Occupational Employment and Wage Statistics (OEWS) program survey data collected from Kansas employers on the number of individuals they employ in each occupation. The distribution of employment by occupation in an industry constitutes a staffing pattern. The OEWS survey is conducted semiannually and uses data from the past three years. For the 2020–2022 projections, survey panels from May 2019, November 2018, May 2018, November 2017, May 2017, and November 2016.
- b. Staffing patterns for industries that are not covered by the OEWS survey are created from national staffing patterns. Federal government staffing patterns are provided by BLS.

### 4. Projecting Occupational Level Employment

- a. The final phase consists of applying occupational staffing patterns from the OEWS survey to base period industry employment totals to produce base year occupational level employment. Next, change factors are applied to the base year staffing patterns to generate staffing patterns for 2022. The modified staffing patterns are used to obtain projected occupational employment levels. This process is completed using the MicroMatrix system.
- b. The MicroMatrix system requires the following inputs:
  - Industry Employment Projections for the base and projection years
  - Occupational Staffing patterns which identify the occupational distribution in a given industry
  - National Occupational Technology Change Factors
  - National Ratios for SE
  - National Occupational Separation Rates
- c. BLS creates the national occupational technology change factors through studies of historical staffing patterns and their determinants. The change factors represent changes that are likely to occur due to changes in technology and business practices, among others. Separation rates are also provided by the BLS (Note: BLS has implemented a new separations method for measuring occupational separations that replaced the replacements method of measuring replacement needs. <https://www.bls.gov/emp/documentation/separations.htm>)

### III. Concepts and Definitions

The following are definitions and concepts that may be helpful in understanding the projections data:

- NAICS Code – North American Industry Classification System (NAICS) uses a six-digit hierarchical coding system to classify all economic activity into twenty sectors. Additional information can be found at <http://www.bls.gov/bls/naics.htm>.
- Industry Title – These are short descriptions of the industry groups based on NAICS codes.
- SOC Code – A six-digit identifier for each occupation. Occupations are aggregated up to a major occupational code, i.e. 11-0000 Management. Additional information can be found at <https://www.bls.gov/soc/>.
- Occupational title – These are short descriptions of occupations based on SOC codes.
- Base Period Employment – The number of jobs in the base period (currently first quarter of 2020).
- Projection Period Employment – The estimated number of jobs in the projection period (currently first quarter of 2022).
- Employment Change – The numerical change in employment from the base period (1st quarter 2020) to the projection period (1st quarter 2022).
- Percent change – Simple percentage change in employment from base period to projection period.

$$\text{Percent Change} = \frac{2022 \text{ Projected Employment} - 2020 \text{ Base Employment}}{2020 \text{ Base Employment}} * 100$$

- Annual Growth Rate – Compounded annual growth rate from base period employment to projection period employment.

$$\text{Annual Growth Rate} = \left( \left( \frac{2022 \text{ Projected Employment}}{2020 \text{ Base Employment}} \right)^{\frac{1}{2}} - 1 \right) * 100$$

- Openings due to Exits – openings that occur when workers leave the labor force entirely.
- Openings due to Transfers – openings that occur when workers leave an occupation and find employment in a different occupation.
- Total Openings – The number of job openings expected in an occupation due to employment change and separation needs (Exits and Transfers).

$$\text{Total Openings} = \text{Employment Change} + \text{Openings due to Exits} + \text{Openings due to Transfers}$$

- Median Wage – The median wage for a given SOC occupation from the Kansas Wage Survey. Additional information can be found at <https://klic.dol.ks.gov/gsipub/index.asp?docid=817>.
- Educational Requirement – The educational category that best describes the most significant source of education or training needed to become qualified (however, not the only method). Additional information can be found at <https://www.bls.gov/emp/documentation/education-training-system.htm>.

Note: As the OEWS survey identifies jobs by occupation, not employer, individuals who change employers, but stay in the same occupation, fall under the category of job turnover and are not included in the growth or openings measure.

#### IV. Assumptions and Considerations

Estimation of future employment is based on the following assumptions:

- Neither current trends in immigration nor immigration law will change significantly
- No significant emergence of employment in new occupations that are not currently defined by the SOC
- There will not be a major war, pandemic, or event that either reallocates factors of production or decreases the amount of capital stock
- Social and educational patterns will continue
- Fluctuations in the business cycle will continue to occur
- Workplace laws and patterns will not change significantly, i.e. an unexpected change in the minimum wage or the average workweek significantly increasing or decreasing

Key points to consider when using occupational employment projections:

- OEWS data do not represent the number of individuals employed, they represent the number of job positions; therefore, one person may be counted twice when holding two jobs.
- Employment data use the place-of-work concept and jobs are counted by the geographical area where the employer is located, not where the employee lives.
- Projected employment data do not portray seasonal fluctuations.

For additional background material regarding industry and/or occupational estimates or projections, please visit the Bureau of Labor Statistics Web site: <https://www.bls.gov/emp/>